dition during his academic life. The following are some of the branches of the work in the personal division:

(i) Provisions for maintaining the health of the normal, healthy student by means of proper exercises, etc.;

(ii) Protection of the physically sound student from communicable diseases that are constantly creeping into the university, by the early detection and isolation of all cases of communicable disease—tuberculosis, typhoid fever, smallpox, scarlet fever, mumps, measles, etc.;

(iii) Provisions for the care and treatment of all such cases of communicable diseases;

(iv) Reconstruction—Reclamation: Correction of defects, advice and treatment to all subnormals;

(v) Advice to and treatment of all ill students.

(*b*) Division of Sanitation: The students' environment must be made as hygienic as possible; hence this division concerns itself with the sanitary conditions affecting the student both on and off the campus.

(*c*) Education: Finally, every student in the university must be made familiar with the elements of personal and public hygiene. Education in these important matters is carried on by means of courses in these subjects, daily bulletins, exhibits, and lectures.

RURAL HYGIENE.[1]

By L. L. LUMSDEN, Surgeon, United States Public Health Service.

Here, so near the corner of Forty-second and Broadway, in the heart of this great Metropolis, it may seem at first thought somewhat incongruous to take up for consideration the subject of Rural Hygiene. I thought of this apparent incongruity while at breakfast this morning. I had for breakfast some grapefruit, some eggs, some buttered toast, and some coffee. It occurred to me that the grapefruit came from a rural district in Florida; the eggs from a rural district in Virginia or Maryland; the wheat from which the toast was made from a rural district in North Dakota; the cream used in the coffee from a rural district up State in New York or in Pennsylvania; the butter on the toast from a rural district in Illinois or Wisconsin; and the coffee from a rural district in Brazil. And I came to realize that several million other persons as well as I, breakfasting in the City of New York this morning, were in close contact with the conditions in the rural districts.

[1] Lecture delivered May 22, 1919, at the Academy of Medicine Building in New York City, in opening the conference on "Rural Hygiene." This conference was held with the School of Training in Public Health Administration conducted by the Public Health Committee of the New York Academy of Medicine, in cooperation with the New York Bureau of Municipal Research and Training School for Public Service.

Under modern facilities of transportation and travel, the bonds of union are many between the residents of our cities and those of our rural districts. The sanitary condition of the rural district reacts upon the health of the city, and the sanitary condition of the city reacts upon the health of the rural district. Therefore no sharp line of demarcation should be drawn between urban hygiene and rural hygiene. Between the fields of work for the conservation and the advancement of the health of our Nation there should be no twilight zones. A reasonable degree of coordination of the forces engaged in this important work is highly indicated.

Definition of Hygiene.

In taking up a subject for discussion it is important, I think, for us to know definitely just what the subject is. The terms "Hygiene" and "Sanitation" are frequently used interchangeably. There is between the two, however, a shade of difference in meaning. An individual who would accept with appreciation suggestions about the "hygiene of the mouth" might resent suggestions about the "sanitation of the mouth." As a rule we apply the term "sanitation" to work which involves the removal of grosser quantities of dirt than are dealt with in the work of hygiene. At a recent meeting of health officers a working up-to-date definition of sanitation was called for. The definition submitted was, "Sanitation is the common-sense application of the principles of cleanliness." I like that definition particularly, because it has common sense in it. Work for the prevention of human sickness and for the saving of human life is so appealing to the intelligent mind awakened to its possibilities that those engaged in it are apt at times to get too far off the ground and fail to proceed in a practical common-sense manner. Several weeks after the formulation of this definition of sanitation I was discussing the subject with a little school girl and obtained from her the best definition of sanitation I have ever heard. It was, "Sanitation means getting things clean and keeping them clean."

In formulating definitions it is difficult to find a stopping place. In having obtained a good definition of sanitation the question immediately arising is: What is cleanliness? Cleanliness is freedom from dirt; dirt is matter out of place. Dirt may be classified as harmless and dangerous. Soil from the top of a hill on which there have recently been no animals, finding its way into the mouth of a person would be dirt; but unless eaten in considerable quantities would do no harm, and thus furnishes an example of harmless dirt. The dangerous dirt with which we are most likely to come into contact in the course of our daily lives is the waste matter from the bodies of human beings. Such dirt is dangerous, because the agents which cause communicable disease in persons live, develop, and multiply in

human juices and tissues, and from the body of the infected person they escape from time to time through the secretions or excretions, or the bites of insects, and find their way under conditions favorable to them to the bodies of other persons.

Eruption of Disease.

In each of the communicable diseases there is what may be termed "the eruption of the disease." Such eruption may be regarded as a warning furnished by nature, because the erupted matter, constituting dangerous dirt, contains the infection which, under unhygienic conditions, may be communicated from person to person. In smallpox the eruption is in the skin and mucous membranes, and a case of smallpox in a person indicates that into the skin or mucous membranes of that person there has been introduced some of the erupted smallpox matter from the body of another person. In diphtheria, scarlet fever, "catching" colds, influenza, mumps, measles, and probably in poliomyelitis, the eruption is in the nose and throat, and a case of any of these diseases in a person indicates that into the nose or throat of that person there has been introduced some of the erupted matter from the nose or throat of some other person. In the most common type of tuberculosis and in the pneumonias the eruption is in the lungs; and these diseases exact their fearful annual toll of human life because the erupted matter from the lungs of the affected persons is spread about in such manner as to reach the lungs of other persons. In malaria the eruption is in the blood, and the erupted matter is taken from the blood of the infected person by mosquitoes of the genus Anopheles and by them conveyed to the blood of other persons. In typhoid fever the eruption is in the intestines and kidneys. A case of typhoid fever in a person is conclusive evidence that that person has eaten or drunk excreta from the body of another person. In the dysenteries, Asiatic cholera, and hookworm disease the eruption is in the intestines. The continued prevalence of the diseases caused by excreta-borne infections shows a woeful lack of observance of the most elementary sanitary measures which are inseparable from the decent fundamental principles of human existence.

The first reference I know of to the eruptions of disease as a basis for sanitary procedure was made by William Budd in his book on typhoid fever. In that book the author suggests an analogy between the intestinal eruption of typhoid fever and the skin eruption of smallpox as a manifestation of disease and as an indication of the source of infection. William Budd, a country doctor practicing medicine in England, became, through the exercise of his remarkable talents for accurate observation and logical deduction, one of the several great pioneer epidemiologists of the world. About the middle of the nineteenth century he wrote a series of papers on

his neighborhood studies of typhoid fever. In these papers he combated in a most convincing manner Murchinson's pythogenic theory of typhoid fever. Budd logically concluded from his observations that the matter from the infected intestines is much more dangerous immediately after its discharge than it is after it has undergone prolonged fermentative changes. He deduced with remarkable skill the nature of the typhoid bacillus years before the discovery of this organism. His complete monograph on typhoid fever was published in 1873. Since that publication, which I regard as one of the most excellent productions in medical or any other literature, but little has been added to Budd's contribution to our practical knowledge of the modes of spread and of the principles of sanitation for the prevention of typhoid fever.

Principles of Hygiene.

One of the main principles of hygiene is to bring about a consistent common-sense observance by individuals and communities of cleanly methods of living to prevent the erupted matter from the bodies of infected persons from being conveyed to and becoming "dangerous dirt" in the bodies of other persons. Another important matter is the establishment and maintenance of conditions in respect to air, water, food, exercise, and sleep, which tend to fortify individuals with vigorous health and the power to overcome invasion of the body by "dangerous dirt."

Hygienic measures may be classified variously as personal and community, rural and urban, etc., but the fundamental principles involved in all of the varieties are the same. Much may be done by the individual or the family for personal protection against hygienic omissions or unhygienic commissions of the community. Thus, individual or home protection against a dangerously polluted water supply or a dangerously contaminated milk supply may be secured by boiling the water and pasteurizing the milk in the home. Screening of the dwelling to eliminate flies and mosquitoes loaded with dangerous dirt is, in our average community, an individual or home hygienic measure of importance. Community hygienic measures, especially in densely populated sections, such as cities and towns, are as a rule more effective than are those that depend for their enforcement upon individual education, desire, and action. Thus if a clean public water supply is the only water supply available, the individuals in a community have to drink clean water whether or not they see any sense in so doing. Furthermore, sanitary protection as a rule may be obtained more economically by concerted community action than by independent individual action. Therefore, the health officer in his program of health work should

do all possible to bring about the establishment and maintenance of public hygienic measures.

No sharp line of demarcation can be drawn between rural and urban hygiene; the principles are practically identical. It is conceivable that the nomadic tribes were comparatively free from communicable disease. They did not remove their filth, but they removed themselves from their filth. The rural district has the advantage of dilution of population as an important factor in preventing the spread of communicable disease; the urban district has the advantage of economic procedure in carrying out mass sanitary measures, such as the installation of a clean public water supply or of an effective and complete sewerage system.

Need of Hygienic Advancement.

The need of intelligent businesslike attention, by both the individual citizens and the communities of the United States, to practical hygienic measures is all too obvious from even very casual observation. In our remarkable period of progress along many important lines in the last quarter of a century the hygienic advancement of our larger cities has been quite gratifying, but the hygienic progress in our smaller cities, towns, and rural districts has been remarkably lacking. In passing through the average small town or rural district in the United States a casual glance from a train window will reveal insanitary conditions which should be shocking to the average person in this day of so-called enlightenment.

A commonly expressed opinion is that the farm is an especially healthful place of human abode. Such opinion prevails with us because of the many obvious natural advantages for healthfulness presented by our average American farm. It has been found, however, that due to neglect of simple, common-sense, inexpensive, and very elementary sanitary measures, the persons living on our farms generally are exposed to conditions which seriously menace their health.

Certain diseases which are caused by infections spread from person to person are, notwithstanding the sparser population, much more prevalent in our rural sections than in our cities. Hookworm disease and malaria are now almost entirely of rural origin. In many sections of our country typhoid fever and dysentery are more prevalent in the rural districts than in the cities. Tuberculosis is appallingly common in our average farming community. These diseases incapacitate persons for useful, profitable labor. They take the joy out of living; they cause untold human suffering and much premature death. And they are preventable!

It is readily within the means of the average American farmer to carry out at his home reasonable sanitary measures for the protection

of himself and his family against the most common filth-borne communicable diseases. The cost of such measures in labor or money is much less than is the cost of their neglect. Our national economic loss, falling especially upon our farming population, from three of the most readily preventable diseases—typhoid fever, hookworm disease, and malaria—is estimated to be more than a billion dollars a year. In this time, of all times, we can not afford such waste.

In the course of sanitary surveys conducted by the United States Public Health Service in 1914, 1915, and 1916, it was found that of over 50,000 typical farm homes distributed over a wide range of our rural districts, only 1.22 per cent were provided with sanitary toilets—and at some which were properly equipped, the equipment was not used by all members of the household; at 68 per cent of these homes the water supply used for drinking and cooking purposes was obviously exposed to contamination from privy contents or from promiscuous deposits of human filth, and often also to pollution from stable yards and pigsties; and at only 32.88 per cent were the dwellings during the summer season effectively screened to prevent flies (having free access to near-by deposits of human and other filth) from entering dining rooms and kitchens and contaminating the foods for human consumption exposed therein. In numerous instances a pond of water of no use and which could have been drained away in an hour by one man, was found near the dwelling, providing a place for the breeding of the mosquitoes which play such an important rôle in the serious annual occurrence of malaria in the household. Cases of tuberculosis of the lungs (consumption) were found in persons who were staying day and night in poorly ventilated rooms, subsisting largely on "store food" and partaking liberally of some expensive patent medicine advertised as a "consumption cure," and gradually dying because they were not using the effective and abundantly available farm "medicines"—fresh milk, fresh eggs, and fresh air. The striking and highly encouraging finding was that the people in our rural communities, though generally uninformed or misinformed about the salient facts of home sanitation, were willing and anxious to learn them; and having learned the facts they would in a large proportion of instances apply them practically.

In the physical examination of our young men drafted from all parts of the United States into our military establishment a startling proportion of seriously incapacitating defectiveness was found. Over 30 per cent presented physical defects of sufficient degree to make the men unfit for arduous military service, and a large proportion of the physical inefficiency among the men was the result of preventable diseases and easily correctible conditions. Flat foot—resulting from faulty foot gear, lack of proper physical exercises, and faulty posture—was conspicuous among the causes for rejection. A large pro-

portion of the flat foot was preventable and should have been prevented by common-sense hygienic measures taken when these men were in their early childhood at home and school. Tuberculosis and the after effects of measles, scarlet fever, typhoid fever, malaria, and hookworm disease, all of which were in large part preventable, were also conspicuous among the causes for rejection. The cross section of our health conditions, furnished by the physical examination of the draftees, presents evidence which should be convincing to even the most obtuse that we—and by "we" I mean the individual, the community, and the local, State, and National Governments—have seriously and fearfully neglected the most important factor in our national development—our human power. We should profit from this lesson of the war. Upon the businesslike attention which, in the future, we devote to our public health, depends largely our opportunity to develop a nation capable of meeting the crises of both war and peace, and of demonstrating to the other nations of the world the value of democracy.

Importance of Rural Hygiene to the National Health.

Over 50 per cent of the population of the United States is rural. Therefore, what affects directly and importantly the residents of our rural districts affects vitally the strength of our Nation. The reference to my breakfast of this morning illustrates the close and important connection between the residents of our urban centers and the sanitary conditions of our rural districts. Thousands of city residents visit the country every day for business or social reasons. The vast bulk of milk and other fresh foods supplied to our large cities are brought in from farm homes. Most of the cities obtain their water supplies from open streams or lakes which receive drainage from extensive rural territories. Through any of these media—persons, food, or water—and also by flies and mosquitoes, infection spread from insanitary rural premises may be conveyed to persons residing in the city. Thus the sanitation of the rural districts has a direct and important bearing on the health of the whole Nation.

Under existing conditions infection is frequently conveyed from the rural districts of one State to communities in other States. From a case of scarlet fever or diphtheria now existing in central Maine, infection may be conveyed to, and cause an outbreak within the next two weeks in, a community in Florida or California. Mosquitoes carrying malaria infection and flies carrying typhoid infection will cross a State line as easily as they will cross a county fence or a line fence between two farms. The average large American city obtains its supply of milk, green vegetables, and fruits from as many as five or six different States. Any of these foods may be

the vehicle of infection. Insanitary conditions at farm homes in one State often are responsible for the contamination of milk or other foods with the seeds of infection which cause extensive outbreaks of disease in cities, towns, villages, and neighborhoods in other States. Many of our cities and towns obtain their water supply from streams or lakes which are polluted with the drainage from rural districts in two or more States. Persons carrying infection in their bodies often travel from one State to others, and with the usual toilet arrangements found on our interstate railway trains may scatter infection along the tracks over which they travel. In view of these facts it is clear that insanitary conditions in the rural districts of one State are, through commerce and otherwise, a menace to contiguous States especially; and, on account of modern transportation facilities, a menace to the whole country. Having such an important bearing on the character of farm products shipped from one State to others, and having such an important bearing on the ability of our whole Nation to raise and maintain armies for the common defense, the problem of rural sanitation appears to be one with which the National Government under constitutional authority may deal, and one with which the National Government from a standpoint of general welfare should deal.

The correction of insanitary conditions at a given home is of most importance to the persons who live in that home; the correction of insanitary conditions in a given community is of most importance to the members of that community; the correction of insanitary conditions in a given State is of most importance to the residents of that State. Therefore it appears logical for those who are most directly affected by and who are most largely responsible for local insanitary conditions to bear the greater part of the burden incident to the carrying out of measures for the correction of these local insanitary conditions. As has been explained, however, insanitary conditions in one locality may be responsible for disease and death among persons in distant localities, and for that reason the correction of insanitary conditions in one locality in a State is of importance to that whole State and to the whole United States. Since the problem of rural sanitation is both intrastate and interstate in character, it appears to be one which should be attacked by the coordinated efforts of county, State, and National health authorities.

In the areas around our National cantonments during the active period of the war, an excellent demonstration was made of coordination and augmentation of the efforts of National, State, and local forces for the improvement of both rural and urban health conditions. The results generally were very striking and furnished one of the good lessons of the war. This coordination and augmentation of health activities was brought about under the stimulus of war-time

needs. When our people generally begin to realize—as eventually they must—what the lack of adequate public health work means to the strength of our Nation, it is reasonable to expect that the stimulus of peace time will become sufficient to bring about such augmentation and coordination.

Sequence and Other Problems.

Health work, even when including in scope only a small community, presents so many branches, any one of which promises beneficial results, that it is difficult for one engaged in it to determine the best sequence in which to take up the different branches and how much effort to give to each one. Health business is like every other business in that it will not run itself. A banking or mercantile business without intelligent management will fail. Without a head, or an organization, to manage it intelligently, a health business will inevitably fail. There is no business in which it is more important to have formulated a good, general plan of operation, and to have exercised a constant, careful attention to details. The part-time health officer and the satisfaction of so many of our communities with part-time seriously inadequate health service, are among our worst misfortunes. If there is any business which needs whole-mindedness and whole-heartedness and all the time and effort which one can give, it is the public health business. One good whole-time health officer is worth more than twenty part-time health officers who might be good health officers if they gave all their time to health work. It is a big, absorbing, and vitally important business. No one is able to look after the details of public health business successfully while devoting a considerable part of his time and energies to some other business. Whole-time health organizations are essential to success.

The personal equation is all important. A health officer with a training in medicine, engineering, bacteriology, or chemistry, has certain specific advantages over one who has not such training. As an important division of health work in all instances is the bedside control of communicable infection, some training in medicine, giving a knowledge of the psychology of the sick room, is particularly advantageous. A collegiate degree with long, intensive training in one of these general sciences does not appear essential. A health officer with highly specialized training for one branch of health work, or with a hobby, may give a lopsided administration. He is the community health doctor and he needs to be a good general practitioner. One of the best city health officers I ever saw in action was, previous to his incumbency as health officer, a veterinary. A general knowledge of the principles and details of public health procedure is, of course, necessary; but tact, "punch," faith, enthusiasm, and, above

all, common sense, are absolutely essential to the successful administration of the business of public health. The head of a health organization has cause frequently to realize that he must "hold on when there is nothing in him except the will which says to him 'hold on.'"

A clear perspective of the business is important. Preliminary to the beginning of general activities some study should be made of the general health conditions of the community in which the work is to be done, in order that a comprehensive constructive plan of procedure may be formulated. The extent of work which may be carried out within the limits of the available resources should be carefully considered, and business-like attention should be given to the investment of every dollar in the health fund and every unit of strength of the health force in order to secure convincingly obvious big dividends on the investment. The continuation of the organization after the first year of operation may depend on the accomplishment of definite results in which the citizens generally of the community happen to be particularly interested. As a public servant, the health officer should consider carefully the existing demands of his people, and should endeavor to create among his people intelligent demands for the most logical health advancement. If, for example, in a community in which malaria or typhoid fever was appallingly prevalent and the people generally were keenly interested in having the prevalence reduced, the local health organization should devote all of its activities to preventing the spread of tuberculosis infection, and at the end of the year be unable to show by the records a reduction in the tuberculosis death rate, it could be understood why the citizens of that community would begin to wonder if their investment for health work was a good one.

Do not construe any of the foregoing to mean that the health officer must be an adroit politician. It is difficult and perhaps inadvisable under democratic government to keep anything of community importance out of politics. The health officer should strive to become good politics instead of becoming a good politician. If successful, his program of work will be advocated and supported by politicians and office seekers and even by statesmen. In health business, as in any other big business, a certain amount of bookkeeping is necessary. Every possible effort should be made to obtain promptly reports of births, deaths, and cases of illness. The statistics should be kept up to date and should be published in intelligible, attractive form, so as to get the attention and interest of the people. The real test of health work is the results in improved general health tone of the community and in lowered sickness and death rates. If such results be obtained, they should be advertised so that the people investing for health work will be enabled to understand that they are getting from their investment a good dividend.

As health business applies to all the people it appears logical for it to be conducted essentially as governmental business. The establishment and maintenance of reasonably adequate governmental—local, State and national—health organizations to function in a common-sense businesslike way in every community in the United States is so logical, in fact, that its realization eventually may be expected. If functioning as a governmental agency, the health organization is supported by funds obtained (presumably, at least) by equitable taxation of the people, and is in a position to operate with and through other official governmental agencies in the enforcement of law. Civic and philanthropic organizations upon entering the very appealing field of public-health work should function so far as may be possible with and through the existing official (governmental) health organizations. If the local official health organization should be wanting, or so inadequate as to make functioning with it difficult or impossible, the civic or philanthropic organization should make its main object in the public-health field the establishment of a reasonably adequate permanent official health organization and conduct its branch of health work with that object in view. If two or more agencies undertake independently to conduct the same public business in the same community, waste of money, loss of motion, friction, confusion, and injury to the general cause are almost sure to result.

A frequent mistake of health departments is to obtain the enactment of health laws which are not backed by sufficient popular sentiment and for the enforcement of which adequate health department machinery is not provided. Health laws should be preceded by popular sentiment. To have laws and not to enforce them is a serious matter in a democracy. The arousing of the right sort of popular sentiment by educational work is the most important single function of the health organization.

It is advantageous for the health organization to adopt a constructive plan of work. The plan, of course, must be sufficiently elastic to be adjustable to unusual emergency conditions. Among the general measures to be considered for adoption in the plan of health work for the average community are (1) quarantine and beside instructions to prevent the spread of dangerous communicable infections; (2) instructions in prenatal care and in the hygiene of infants of preschool age; (3) hygiene of schools and of other public buildings, and physical examination and physical training of school children; (4) control of soil pollution; (5) control of insects likely to convey infection; (6) safeguarding water and food supplies and giving instructions on the principles of dietetics; (7) life-extension work; (8) organization of local clubs for instruction and training in physical development and general hygiene; (9) antituberculosis work directed especially toward the discovery and the encouragement of

proper self-treatment of cases of incipient and early-stage tuberculosis; and (10) educational work, through lectures, printed articles, moving pictures, and other available agencies, concentrated from time to time on different specific subjects, etc.

The field is large. Some health organizations fail because they undertake to carry out too many branches of health work at the same time. Their efforts are too diffused and the results are not sufficiently obvious to carry popular conviction. Concentration on one branch or two or three closely related branches for a set period of time is usually advisable. The sequence in which the different branches of work are concentrated upon is very important. A sequence which would be good in one community might be absurd in another community. The launching of an energetic campaign for the improvement of dietetic conditions, or for the control of mosquitoes, though needed in a community in which pellagra and malaria prevail, would be out of order while that community was suffering from a rapidly spreading, overwhelming epidemic of influenza. A plan of health work for a community of 20,000 to be carried out by a one-man health organization necessarily has to be different from one that is to be carried out by an organization consisting, for instance, of a whole-time health officer, two health nurses, and two sanitary inspectors.

For the successful conduct of health business the health officer must cut his garment according to his cloth. He should take inventory of his stock. He should consider when and where the different lines of his stock are needed and will be used to the most advantage. In short, he should use common sense and proceed in a business-like way with the vitally important business which he has at hand.

The United States Public Health Service Plan of Rural Health Work.

From year to year in the annual conference of State health officers with the Public Health Service the reports from the different States indicated progress in urban hygiene, but little or no progress in rural hygiene. In the conference of 1910 the large majority of opinion—in fact, an apparently unanimous one—expressed by the practical experienced State health officers present, was that the outlook for considerable hygienic progress in our rural districts within a generation was about hopeless and that the only chance for advancement in this important field was offered by the teaching of hygiene in the public schools. It was thought that the school children with instructions in hygiene might, upon becoming grown-up, apply their hygienic knowledge, but there was no optimism about the teaching of old farmers new hygienic tricks.

I visualized the situation in the public school which I attended when I was a boy. The school building was a one-room log house with one door and two small windows. In winter the windows and the door were kept tightly closed and the room was heated with a large wood-burning stove located near the center of the room. Expectoration on the floor and on the hot stove was one of the frequently engaged in indoor amusements. The teacher, as a rule, was a girl from 18 to 25 years of age, and had "completed" her education in this school a year or so before. Her salary was $25 a month. The water supply of the school was served from an open pail with one common tin dipper, which, when not in use, was left in the pail of water. The water was obtained either from an unprotected spring located below a soil-polluted wooded drainage area or from an open dug well exposed constantly to gross pollution from a near-by pigsty or an open privy at a neighboring home. No school toilets were provided. In responding to the calls of nature the teacher, the boys, and the girls had recourse to such privacy as the surrounding woods afforded. I knew that conditions comparable to these obtained in 1910 at a large proportion of the small rural schools in the United States. I tried to conceive of the glorious courage of a school teacher who under such conditions would undertake in the school the academic teaching of hygiene. I realized that an attempt to teach hygiene in the face of such unhygienic surroundings would not be apt to carry conviction to the minds of the children. It appeared clear that success in teaching hygiene in the schools could not be expected until the adult patrons and authorities of the schools were persuaded to effect the sanitation of the school and the school grounds.

Some of the younger and less experienced health officers at the conferences of 1910 and 1911 suggested rather timidly that in view of the adoption by rural adults of recent knowledge for improvement of methods of farming, orcharding, and stock raising, something might be expected from intensive campaigns for rural sanitation among the existing generation of adults in the rural districts.

In the spring of 1911 an officer of the Public Health Service was detailed to cooperate with the State board of health in making a sanitary survey in Yakima County, Wash. Yakima County had had, as far back as the records went, a high typhoid-fever rate—over three times as high as the average rate for the United States as a whole. In the course of the intensive sanitary survey, practical measures for the correction of the obviously insanitary conditions were recommended by the investigators and were carried out by the local people. As a result, the annual prevalence of typhoid fever in the county, as a whole, was reduced by about 90 per cent. In North Yakima, the principal town and the county seat, with a population of 14,082 in 1910, and of about 18,700 in 1914, the number of deaths

from typhoid fever reported each year in the period of seven years, including that of the campaign (1911), was as follows:

In 1908, 25; in 1909, 20; in 1910, 30; in 1911, 6; in 1912, 4; in 1913, 3; in 1914, 2. Of the deaths in 1911, 1912, 1913, and 1914, 2, 4, 3, and 2, respectively, were of persons who had contracted the disease elsewhere and who were brought to North Yakima for treatment. Thus, in the period of three years—1912, 1913, and 1914—not a death from typhoid fever of local origin was reported in this once heavily infected locality. In Yakima County, outside of North Yakima, deaths from typhoid fever were reported as follows: In 1910, 25; in 1911, 11; in 1912, 3; in 1913, none. A wholesome reduction in the death rate from causes other than typhoid fever also was accomplished. In 1910, the year preceding that of the survey, the number of deaths from all causes in the county was 517, and in 1912, the year succeeding that of the survey, 377.

While the work was in progress Yakima County established the precedent of creating the position of whole-time county health officer. A competent sanitarian was appointed to fill the position at a salary of $5,000 a year. The annual appropriation for health work was increased by about $6,500, and the results in the prevention of sickness and the economic losses incident thereto indicated that this was one of the best financial investments ever made by a county.

With this remarkable demonstration furnished by Yakima County it seemed possible that by intensive methods of work popular sentiment could be aroused for the advancement of sanitation in rural communities generally. It was realized, however, that conclusions about the prospects for success could not be drawn from the results in one county and that studies in counties presenting a wide range of conditions were needed.

From 1911 to 1914 the Public Health Service conducted studies of a number of typhoid fever outbreaks in country neighborhoods in different parts of the United States. Most of the outbreaks studied were in the State of Virginia. From these studies the direct relation of insanitary conditions to the spread of disease was clearly defined and the most salient features of sanitation needed at our rural homes generally were determined.

In the spring of 1914 a few thousand dollars from the fund appropriated for field investigations by the Public Health Service were allotted for special studies of rural sanitation, and with that money a plan of intensive rural sanitary surveys of representative counties in different parts of the country was begun. In the summers and falls of 1914, 1915, 1916, and 1917, these surveys were extended to 18 counties located in 16 States. The findings and the results of those surveys are presented in detail in Public Health Bulletin No. 94.

The conclusions from the surveys were:

1. Rural sanitation is needed.

2. Rural sanitation is feasible.

3. The cost of work necessary to secure marked advancement in rural sanitation is many times less than the cost of the illness and of the physical inefficiency which will be prevented by such advancement; therefore, prolonged, intensive, reasonably directed work for the advancement of sanitation in the rural districts generally of the United States would prove economic.

From follow-up observations on progress and retrogression in the counties surveyed from 1914 to 1917, and from the results of the rural sanitation work in the extra-cantonment areas in 1917 and 1918, it was concluded that for sustained advancement in rural hygiene the maintenance of a reasonably adequate official health organization constantly to look after the business of public health in the rural district is essential. Therefore the present plan of the Public Health Service in the field of rural health work is directed toward stimulating and assisting and actively cooperating with county and State health organizations in the establishment and maintenance of whole-time health organizations for continued cooperative health work in counties or townships as units of rural district government.

The need from a national standpoint of rural health work in the United States and the convincing evidence that without assistance from the National Government the work will not be carried forward generally at a reasonably adequate rate, indicate that in this field the National Government has a responsibility and an all-sufficient motive to take part. In view of all the angles of the situation the extreme conservatism of Congress in making appropriations for the rural health work of the Public Health Service is difficult to understand. The enactment of a bill, designated as the rural health act, and now pending before Congress, would enable the National Government to proceed in a systematic manner and in a way to evidence sincerity of purpose to do what appears essential for the vitally important and seriously needed general advancement of hygiene in the rural districts of our country.

The county demonstration work in rural sanitation now being conducted by the Public Health Service on as extensive a scale as the very limited appropriations will permit, and in cooperation with State boards of health and with county governments, is, briefly, as follows:

The county authorities made application for the cooperation. If their application is approved by their State board of health, a plan of work acceptable to all of the cooperating agencies is drawn up and agreed to. For the expenses of the work, as a rule, the county bears

one-half, the State board of health one-fourth, and the United States Public Health Service one-fourth. The size of the force to do the demonstration work varies with the needs and the resources of the county. For a rural county with a population of 20,000 or over, a health force for reasonably adequate work should consist at least of a whole-time health officer, a whole-time health nurse, and a whole-time sanitary inspector. For a smaller county, or for a large county in which sufficient funds for an adequate organization can not be made available, one health nurse or one sanitary inspector, working under an approved plan and under proper supervision, may accomplish a demonstration of much immediate value and one which will develop a public sentiment for a larger investment by the county for health work. To the county health officer, acting as head of the demonstration unit, invariably, and to the other members of the force, as a rule, is given an official status in the county government, the State board of health, and the Public Health Service. Since the appointees must be acceptable to each of the cooperating agencies, the county authorities in making the appointments are relieved of local political embarrassment. Preliminary to the formulation of the plan of work a trained sanitarian from the State board of health or one from the Public Health Service, or one from both, visits the county to study local conditions and to advise with the county authorities. Careful attention is given to the sequence in which the different branches of work are to be carried out to meet the most pressing health needs of the county. The scope of the work is indicated by the form of monthly progress reports sent by the head of the demonstration unit to each of the cooperating agencies, which is as follows:

Place_____.

Date_____

Progress Report No. _____

COOPERATIVE RURAL SANITATION WORK.

Report for month of _____, year _____, county of _____, State of _____.

Head of unit _____ Official titles: _____
P. H. S.

_____ _____ _____.
State. County. Address.

1. PERSONNEL:

Name.	Title.	Salary monthly.					Remarks.
		P.H.S.	State.	County.	Other agencies.	Total.	

2. EXPENDITURES:

Source.	Salaries.	Travel.	Miscellaneous.	Total for month.	Total to date.
P. H. S.					
State					
County					
Other agencies					
Totals					

3. PHASES OF WORK:

a. Educational:
(1) Lectures No. ..... Previously reported..... Total.....
Attendance..... Previously reported..... Total.....
(2) Pieces of literature distributed..... Previously reported..... Total.....

b. Sanitary inspections:

	Number.	Previously reported.	Total.
(1) Private homes			
(2) Schools			
(3) Churches			
(4) Stores, markets, etc.			
Total			

3. PHASES OF WORK—Continued.

c. Special inspection.....

Food-product places.....

d. Physical examination of school children:
(1) Number examined..... Previously reported..... Total.....

(2) Number found defective..... Previously reported..... Total.....

e. Number of life-extension examinations..... Previously reported..... Total.....

f. Public health nursing:
(1) Number of visits to cases communicable disease..... Previously reported..... Total.....
(2) Number of talks given to groups of persons. Previously reported..... Total.....
(3) Number of visits to give prenatal care.... Previously reported..... Total.....
(4) Number of visits to explain and demonstrate infant hygiene..... Previously reported..... Total.....

g. Laboratory examinations:

Specimens.	Positive.	Negative.	Total.
Blood for Widal.....			
Blood for B. typhosus.....			
Smears for B. diphtheriæ.....			
Sputum for B. tuberculosis.....			
Feces for hookworm.....			
.....			
.....			
.....			
Water for B. coli.....			
Milk for high bacterial content.....			
.....			
.....			
Total.....			

h. Immunization:
(1) Number of complete antityphoid inoculations..... Previously reported..... Total.....
(2) Number of antismallpox vaccinations.... Previously reported..... Total.....
(3) Number of complete antipneumonia inoculations..... Previously reported..... Total.....

i. Antimalaria work:
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.....
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j. Number of persons treated for removal of hookworm infection..... Previously reported..... Total.....

k. Venereal disease prevention:
(1) Numberof prophylactic treatments..... Previously reported..... Total.....

(2) Number of curative treatments..... Previously reported..... Total.....

l. Number of visits by health officer or his assistants:
(1) To diagnose suspected cases infectious disease..... Previously reported..... Total.....
(2) To impose quarantine measures..... Previously reported..... Total.....

m. Number of cases quarantined..... Previously reported..... Total.....

n. Other activities:

4. RESULTS:

a. Sanitary privies installed:

Type.	Number.		
	During month.	Previously reported.	Total.
L. R. S.			
Concrete vault.			
Bucket and box.			
Pits.			
Total.			
b. New sewer connections.			
c. New water connections.			
d. Wells improved.			
e. Springs improved.			
f. Public milk supplies radically improved.			

g. Other results:

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5. STATISTICS:

	Number.	Rate for current month.	Rate for corresponding month of previous year.
(a) Births.			
(b) Deaths.			

(c) Reportable diseases.

	Reported during month.		Reported in corresponding month of previous year.	
	Cases.	Deaths.	Cases.	Deaths.
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6. REMARKS:

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Respectfully submitted.

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(Signature.)

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(Title.)

The results of this cooperative plan of county health work have been highly gratifying and apparently warrant a radical extension of the business.

The officers of the Public Health Service detailed to inspect from time to time the work in the county demonstration units have a remarkable opportunity to study on a wide scale the problem of national health work. One of these supervising officers, Assistant

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Surgeon K. E. Miller, served for two years, from 1917 until 1919, as whole-time health officer of Edgecombe County, N. C. He was detailed to that duty for the purpose of making a practical study of the problem of county health work as it may be conducted by a one-man health force. His results furnished an excellent demonstration of the possibilities of county health work conducted on a very economical basis. Dr. Miller's report on the work in Edgecombe County probably will be published by and obtainable in the near future from the Public Health Service.

In the work of the Public Health Service in the field of rural sanitation a demonstration has been made of the importance of concentration of the activities of the health force from time to time on one branch of sanitation with a view to obtaining concrete results. In the counties in the South in which malaria and typhoid fever and hookworm disease are highly prevalent, a concentration of activities to control mosquitoes or to secure sanitary collection and disposal of human excreta has been effective in convincing the citizens of the immediate value of the work, and so has served to develop what appears to be a lasting local popular sentiment to continue the health organization and so enable it to go on with other important branches of county health work. Specific measures for the control of mosquitoes, for the obtainment of safe water supplies, and for the safe disposal of human excreta in a rural community, are described in publications of the Public Health Service (Supplement No. 18 and Public Health Bulletins Nos. 68, 69, 70, and 89) which can be obtained on request from the United States Public Health Service, Washington, D. C.

Conclusion.

The master key to the door of success in the public health business is *work*. The health officer who consistently works hard will often succeed in much higher degree than the health officer of greater attainments who does not work so hard. Do not be discouraged if your efforts do not result in the establishment of perfect conditions. Get the best results you can and strive for more and better. Be practical; use common sense.

DIVISION OF VENEREAL DISEASES, SEPTEMBER, 1919.

The accompanying table covers the activities of 199 of the clinics operating under the joint control of the United States Public Health Service and State boards of health for the month of September, 1919.

The table shows that during the month there were 9,103 admissions and 21,127 remaining from last month, making a total of 30,230 under treatment; that 705 were discharged as cured, 1,056 as probably